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Amendment and Response

Applicant: Trudy L. Benjamin et al.

Serial No.: 10/827,135

Filed: April 19, 2004

Docket No.: 200309237-1

Title: FLUID EJECTION DEVICE WITH IDENTIFICATION CELLS

IN THE CLAIMS

Please cancel claims 43, 48, and 69-73, without prejudice.

Please amend claims 1, 35, 36, 40, 44, 46, 47, 49, 61, 63, and 64 as follows:

1. (Currently Amended) A fluid ejection device comprising:
an identification line; and
identification cells electrically coupled to the identification line, wherein each of the identification cells comprises a memory circuit and a memory element, wherein each memory circuit is adapted to receive and respond to signals to selectively store a value in the memory circuit, wherein the value determines whether the identification cell is responsive to signals received on the identification line to perform at least one of the following:
read the memory element; and
program the memory element.
2. (Original) The fluid ejection device of claim 1, wherein the memory element comprises a fuse coupled to the identification line.
3. (Original) The fluid ejection device of claim 2, wherein the memory element is in a first state if a resistance of the memory element is greater than 1000 ohms and the memory element is in a second state if the resistance of the memory element is less than 400 ohms.
4. (Original) The fluid ejection device of claim 1, wherein the memory element is configured to conduct current supplied on the identification line to determine a state of the memory element.
5. (Original) The fluid ejection device of claim 1, wherein the memory circuit comprises a switch coupled to the memory element, wherein a state of the switch is controlled by the value.

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6. (Original) The fluid ejection device of claim 5, wherein the switch is configured to be turned on by the value to program the memory element and to read a state of the memory element.
7. (Original) The fluid ejection device of claim 1, wherein a program signal provided on the identification line to program the memory element comprises a pulse having a voltage level of approximately fourteen volts and a pulse width of approximately one microsecond in length.
8. (Original) The fluid ejection device of claim 1, wherein the memory circuit is a dynamic memory circuit.
9. (Original) The fluid ejection device of claim 1, further comprising data lines, wherein each of the identification cells is configured to receive at least one of the signals on at least two corresponding data lines.
10. (Original) The fluid ejection device of claim 9, wherein each identification cell comprises at least one transistor each of which is coupled to a corresponding one of the at least two data lines.
11. (Original) The fluid ejection device of claim 1, comprising:
a first line adapted to receive a first signal;
a second line adapted to receive a second signal; and
a third line adapted to receive a third signal, wherein at least one of the identification cells is configured to receive and respond to the first signal, the second signal, and the third signal to change the value.
12. (Original) The fluid ejection device of claim 1, comprising:
a first line adapted to receive a first signal, wherein each of the identification cells comprises:
a switch comprising a control input; and

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a first transistor configured to receive the first signal to charge the control input.

13. (Original) The fluid ejection device of claim 12, comprising:

a second line adapted to receive a second signal; and

a third line adapted to receive a third signal, wherein each of the identification cells comprises:

a second transistor configured to receive the second signal; and

a third transistor configured to receive the third signal, wherein the second transistor and the third transistor are controlled to selectively discharge the control input.

14. (Original) The fluid ejection device of claim 13, comprising:

a fourth line adapted to receive a fourth signal, wherein the one of the identification cells comprises:

a fourth transistor configured to receive the fourth signal, wherein the second transistor and the fourth transistor are controlled to selectively discharge the control input.

15. (Original) The fluid ejection device of claim 14, comprising:

a fifth line adapted to receive a fifth signal, wherein the one of the identification cells comprises:

a fifth transistor configured to receive the fifth signal, wherein the second transistor and the fifth transistor are controlled to selectively discharge the control input.

16. (Original) The fluid ejection device of claim 1, wherein the signals comprise enabling signaling that comprises:

a first signal comprising a first pulse employed to pre-charge the one of the identification cells; and

a second signal comprising a second pulse employed to selectively discharge the one of the identification cells.

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17. (Original) The fluid ejection device of claim 16, wherein the first pulse and the second pulse are non-overlapping pulses.
18. (Original) The fluid ejection device of claim 16, wherein the second pulse overlaps at least the initiation of a program signal.
19. (Original) The fluid ejection device of claim 16, wherein the second pulse overlaps at least the initiation of a read signal.
20. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates a manufacturer of the fluid ejection device.
21. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates a product type.
22. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates an out of ink detection level for the fluid ejection device.
23. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates product version information.
24. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates a thermal sense resistance value for the fluid ejection device.
25. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates a uniqueness number.

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26. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates a drop weight delta value.
27. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates whether an original equipment manufacturer printer is unlocked.
28. (Original) The fluid ejection device of claim 1, wherein at least one of the identification cells stores identification information that indicates a seller of an original equipment manufacturer fluid ejection device.
29. (Original) The fluid ejection device of claim 1, further comprising input pads, wherein the identification line is configured to detect ink shorts between each of the input pads and the identification line.
30. (Original) The fluid ejection device of claim 1, further comprising input pads, wherein the identification line is disposed adjacent the input pads and spaced apart from the input pads.
31. (Original) The fluid ejection device of claim 1, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of identification cells to the number of signal lines plus the identification line is greater than one.
32. (Original) The fluid ejection device of claim 1, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of identification cells to the number of signal lines plus the identification line is greater than 1.5.
33. (Original) The fluid ejection device of claim 1, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of identification cells to the number of signal lines plus the identification line is greater than two.

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34. (Original) The fluid ejection device of claim 1, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of identification cells to the number of signal lines plus the identification line is greater than four.

35. (Currently Amended) A fluid ejection device comprising:
a group of data lines;
an identification line adapted to conduct a program signal and a read signal; and
identification cells electrically coupled to the identification line, wherein each of the identification cells is coupled to at least two data lines in the group of data lines and is adapted to conduct and respond to signals transmitted ~~on the signals received on the~~ at least two data lines to be selectively enabled, wherein each enabled identification cell is adapted to be programmed via the program signal and read via the read signal; and
wherein the group of data lines is configured to receive data representing an image and the signals that selectively enable the identification cells.

36. (Currently Amended) The fluid ejection device of claim 35, wherein the signals on the at least two data lines are in a first state to enable one of the identification cells and the rest of the group of data lines are in a second state.

37. (Original) The fluid ejection device of claim 35, wherein the at least two data lines are in a first state to enable one of the identification cells and at least one of the at least two data lines is in a second state to disable the one of the identification cells.

38. (Original) The fluid ejection device of claim 35, wherein the at least two data lines is three data lines.

39. (Original) The fluid ejection device of claim 38, wherein the at least two data lines is three data lines and the three data lines are in a first state to enable one of the identification cells and the signals on the rest of the group of data lines are in a second state.

40. (Currently Amended) A fluid ejection device, comprising:
input pads; and

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an identification line adapted to conduct a program signal to program identification information and a read signal to read identification information, wherein the identification line includes finger portions situated between adjacent input pads and is configured to conduct a signal to detect low impedances between the identification line and each of the input pads.

41. (Original) The fluid ejection device of claim 40, comprising:

identification cells electrically coupled to the identification line, wherein each of the identification cells is adapted to conduct enabling signaling and to be programmed via the program signal and read via the read signal based on the enabling signaling.

42. (Original) The fluid ejection device of claim 40, wherein the identification line is disposed adjacent each of the input pads and spaced apart from each of the input pads.

43. (Cancelled).

44. (Currently Amended) A fluid ejection device, comprising:

data lines for receiving data representing an image and receiving signals that selectively enable identification cells;

means for responding to the signals~~received enabling signaling~~ to provide an enabling value; and

means for storing the enabling value that selectively enables the identification cells to be programmed via a program signal and read via a~~the~~ read signal.

45. (Original) The fluid ejection device of claim 44, further comprising means responsive to the program signal to store identification information.

46. (Currently Amended) The fluid ejection device of claim 44, wherein the means for storing the enabling value~~responding to the received enabling signaling~~ comprises:

means for pre-charging the identification cell; and

means for ~~selectively~~ discharging the identification cell.

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47. (Currently Amended) The fluid ejection device of claim 45, wherein the means for ~~storing the enabling value~~~~responding to the received enabling signaling~~ comprises:
means for discharging the identification cell; and
means for ~~selectively~~ charging the identification cell.
48. (Cancelled).
49. (Currently Amended) The fluid ejection device of claim 44, wherein the ~~data lines~~~~means for receiving enabling signaling~~ comprises ~~three data lines~~~~means for receiving~~ three signals and the means for responding to the ~~signals~~~~received enabling signaling~~ comprises means for responding to the three signals being in a first state to enable one of the identification cells.
50. (Original) A method of programming a fluid ejection device, comprising:
receiving a program signal;
receiving enabling signaling at an identification cell;
responding to the received enabling signaling to provide an enabling value; and
storing the enabling value that selectively enables the identification cell to be programmed via the program signal.
51. (Original) The method of claim 50, comprising responding to the program signal to store identification information.
52. (Original) The method of claim 51, wherein responding to the received enabling signaling comprises:
pre-charging the identification cell; and
discharging the identification cell selectively.
53. (Original) The method of claim 51, wherein responding to the received enabling signaling comprises:
discharging the identification cell; and
charging the identification cell selectively.

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54. (Original) The method of claim 51, wherein receiving enabling signaling comprises receiving enabling signaling and data signals representing an image on data lines.
55. (Original) The method of claim 51, wherein receiving enabling signaling comprises receiving three signals and responding to the received enabling signaling comprises:
 responding to the three signals being in a first state to enable the identification cell;
and
 responding to at least one of the three signals being in a second state to disable the identification cell.
56. (Original) A method of reading a fluid ejection device, comprising:
 receiving a read signal;
 receiving enabling signaling at an identification cell;
 responding to the received enabling signaling to provide an enabling value; and
 storing the enabling value that selectively enables the identification cell to be read via the read signal.
57. (Original) The method of claim 56, wherein responding to the received enabling signaling comprises:
 pre-charging the identification cell; and
 discharging the identification cell selectively.
58. (Original) The method of claim 56, wherein responding to the received enabling signaling comprises:
 discharging the identification cell; and
 charging the identification cell selectively.
59. (Original) The method of claim 56 wherein receiving enabling signaling comprises receiving enabling signaling and data signals representing an image on data lines.

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60. (Original) The method of claim 56, wherein receiving enabling signaling comprises receiving three signals and responding to the received enabling signaling comprises:
- responding to the three signals being in a first state to enable the identification cell;
 - and
 - responding to at least one of the three signals being in a second state to disable the identification cell.
61. (Currently Amended) A fluid ejection device comprising:
- an identification line; and
 - a plurality of cells, each comprising:
 - a memory element coupled to the identification line;
 - a first switch coupled to the memory element, wherein the first switch in a stored charged state allows the memory element to respond to signals received on the identification line; and
 - a second switch coupled to the first switch, the second switch discharging the stored charge state of the first switch to prevent the memory element from responding to the signals received on the identification line.
62. (Original) The fluid ejection device of claim 61, wherein each memory element comprises a fuse coupled to the identification line.
63. (Currently Amended) The fluid ejection device of claim 61, further comprising a first line adapted to receive a first signal and wherein each cell comprises a third switch configured to receive the first signal to charge the first switch to the stored charge state to allow the memory element to respond to the signals received on the identification line.
64. (Currently Amended) The fluid ejection device of claim 63, further comprising a second line adapted to receive a second signal and a third line adapted to receive a third signal, wherein each of the cells comprises:
- a fourth switch configured to receive the second signal; and

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a fifth switch configured to receive the third signal, wherein the fourth switch and the fifth switch are controlled to selectively discharge the stored charge state of the first switch.

65. (Original) The fluid ejection device of claim 61, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of cells to the number of signal lines plus the identification line is greater than one.

66. (Original) The fluid ejection device of claim 61, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of cells to the number of signal lines plus the identification line is greater than 1.5.

67. (Original) The fluid ejection device of claim 61, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of cells to the number of signal lines plus the identification line is greater than two.

68. (Original) The fluid ejection device of claim 61, comprising signal lines configured to provide enabling signal, wherein a ratio of the number of cells to the number of signal lines plus the identification line is greater than four.

69-73 (Cancelled).